ABSTRACT OF THE DISCLOSURE

A microprocessor is configured to fetch a compressed instruction set which comprises a subset of a corresponding non-compressed instruction set. The compressed instruction set is a variable length instruction set including 16-bit and 32-bit instructions. The 32-bit instructions are coded using an extend opcode, which indicates that the instruction being fetched is an extended (e.g. 32 bit) instruction. The compressed instruction set further includes multiple sets of register mappings from the compressed register fields to the decompressed register fields. Certain select instructions are assigned two opcode encodings, one for each of two mappings of the corresponding register fields. The compressed register field is directly copied into a portion of the decompressed register field while the remaining portion of the decompressed register field is created using a small number of logic gates. The subroutine call instruction within the compressed instruction set includes a compression mode which indicates whether or not the target routine is coded in compressed instructions. The compression mode is stored in the program counter register. The decompression of the immediate field used for load/store instructions having the global pointer register as a base register is optimized for mixed compressed/non-compressed instruction execution. The immediate field is decompressed into a decompressed immediate field for which the most significant bit is set.

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